

Tropical GRIP Forecast Discussion for September 6, 2010

Created 1600 UTC September 6, 2010

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Summary:

While today is a no-fly day for the Global Hawk and the WB-57, the DC-8 is in St Croix on a suitcase deployment in coordination with PREDICT and scheduled to fly Ex-Gaston today at 1800 UTC for eight hours. Ex-Gaston has continued to move into more and more favorable environmental conditions yet still has not regenerated into a depression or even a tropical storm as was suggested by several models over the last few days. If Ex-Gaston does redevelop, the DC-8 will be in an excellent position to observe genesis today and tomorrow, and if it does not redevelop, as some models suggest, then this will be an excellent non-developing case for GRIP. However, observations made by PREDICT as well as the convection on the east side of the vorticity center today indicates the invest could be trying to reform. Elsewhere, tropical storm Hermine has formed in the Bay of Campeche and will be making landfall near the Mexico/Texas border of the GOM, and this was well-forecasted by the GFS several days ago. There are two AEWs with associated pouches in the central and east Atlantic named PGI-39L and PGI-41L, respectively. Currently there is no development expected with either of those systems in the next 48 hours.

Forecast for 1600 UTC 9/06/2010:

Synoptic Overview:

Quite a few interesting features are in play in the GRIP domain today. There are a few tropical disturbances (**S1**) as well as several upper level features impacting them.

In the Gulf of Mexico, 1001 hPa Tropical Storm Hermine is dominating the west and southwest portions of the Gulf, and has had impressive convection flaring over the last day (**S2, S3**). Water vapor imagery (**S6**) shows that upper levels near the system are very moist, and TPW imagery (**S4**) indicates well that the system is in a low-level moisture maximum, and these are helping to enhance the convection. CIMSS upper level winds show (**C1**) the outflow aloft of Hermine that has been aiding the convection as well. There is also quite a bit of substantial northwesterly and northerly shear outside of the system to the east in the Gulf extending down into the western Caribbean (**C2**). Further north, a stalled frontal boundary sits along the northern Gulf coast and across Florida (**S1**) dividing the substantially dry air behind it from the very moist Gulf of Mexico air (**S6**). This has brought numerous showers and thunderstorms across the Florida peninsula.

There is a strong upper level low in the Caribbean extending across Hispanola as seen in the vorticity and upper level winds analysis by CIMSS (**C3, C1**). This system lies ahead of Ex-Gaston (**S1, C4**), which is currently located just to the east of the Windward Islands. It is possible that these two systems may begin to interact soon, in a manner that could be unfavorable for further development of Ex-Gaston. Ex-Gaston does not currently have a lot of dust located in a region that could interact with it (**S6**), but there is

substantial dry air behind the system associated with the SAL (**D1, D2, D3**). The SAL has aided the suppression of convection in the large area between Ex-Gaston and PGI-39L. These tropical easterly waves have been in fairly zonal deep layer easterly winds flowing to the south of the Subtropical Ridge that has been dominating the central North Atlantic. Until the ridge breaks down, the path of future waves should not include early recurvature, and continue to follow a westward heading after leaving West Africa in the near future.

However, the present overall synoptic environment across the eastern Atlantic is less than conducive for tropical development. Off the coast of Africa, 250-hPa winds are on the order of 30-40-kt. These northeasterly winds traverse much of central Africa and the eastern Atlantic. There is an upper-level trough between 20° N and 30° N and 10° W and 30° W affecting tropical disturbances that are emerging off of the African coast. The 250-hPa winds out ahead of this trough are 20-30-kt and southwesterly over the eastern Atlantic (**C1**). These winds turn more westerly over northern Africa. At mid and lower levels (400-850-hPa), 20-30-kt northeasterly winds prevail across much of the eastern Atlantic. These conditions are producing moderate 200-900-hPa shear over much of the eastern Atlantic, south of the Cape Verde Islands (**C2**). The water vapor image of this area shows dry air associated with a trough located to the northwest of Africa over the northeastern Atlantic (**S8**).

The eastern Atlantic off the coast of Africa currently features anomalously warm SSTs, which are conducive for development (**H4**). Features that come off of Africa and can survive the high wind shear environment until conditions become more favorable will then have a chance to develop due to encountering warmer SSTs and higher oceanic heat content.

Another influence on the tropics in the region is the presence of dry air. The CIMSS analysis of the Saharan Air Layer suggests that there is an abundance of dry air to the northwest of Africa across the northeastern Atlantic. GEOS-5 analysis at 0600 UTC shows that this region has considerable dust mass at 850-hPa (**D6**). This dust decreases in concentration at 700-hPa (**D5**) and especially at 500-hPa. If this dust mass can impinge the core of a westward moving AEW it could affect the microphysics in the system. Much still has yet to be determined about the role of SAL dust in developing waves.

Features of Interest:

TS Hermine:

TS Hermine became a Tropical Storm at 0900 UTC this morning and as of 1200 UTC is located at 23.4°N, 95.8°W with winds of 45 kts. Microwave imagery (**H1**) indicates much better organization than yesterday, with banding features in place around the core of the system. An ASCAT pass from 0400 UTC shows well-developed cyclonic flow with maximum wind estimates of 30 kts (**H2**). A well-defined anticyclone above the system is aiding in the system's development (**C1**), with the system also moving towards decreasing shear values of around 10 kts (**H3**) and SSTs around 30°C (**H4**). Model guidance forecasts Hermine making landfall near the Corpus Christi area at 1200 UTC Tuesday (**H5**). Intensity is kept at tropical storm strength with a maximum of 45-60 kts at 0000 UTC Tuesday, with dissipation expected by models except for the statistical models, SHIPS and SHF5, which make an assumption that the system will remain over

water (**H5**). The track for the system is in line with what the GFS has consistently predicted for the past 48 hours, whereas the other models had been not developing the system and severely limiting its time over water. Officially, the NHC guidance for Hermine is as follows:

Initial:	06/15Z	23.4°N, 95.8°W	45 kt
12 HR VT:	07/00Z	24.9°N, 96.9°W	60 kt
24 HR VT:	07/12Z	27.0°N, 98.3°W	55 kt... Inland
36 HR VT:	08/00Z	29.1°N, 99.6°W	30 kt... Inland
48 HR VT:	08/12Z	31.4°N, 100.4°W	25 kt... Post-trop/Remnt Low
72 HR VT:	09/12Z	36.0°N, 99°W	20 kt... Post-trop/Remnt Low
96 HR VT:	10/12Z	Dissipated	

Ex-Gaston/PGI-38L:

At 1300 UTC the center of circulation of the remnants of Gaston were situated at 17.4°N and 56.0°W. This system looks considerably less organized compared to the last 24 hours. The current visible satellite shows that the convection has become elongated and is now oriented from northwest to southeast. In addition, the center of ex-Gaston remains exposed with most of the convection displaced to the west and southwest of ex-Gaston's center (**G1**). Observations indicate that the system continues to be subjected to 15-20-kts of 200-900-hPa easterly shear (**G2**). Another possible negative influence on the system is the presence of dry air located to the east at multiple levels, as indicated by water vapor imagery (**G3**) and TPW (**S4**).

The environment for ex-Gaston is expected to continue to become more favorable for redevelopment over the next couple of days. As the system pushes westward it will traverse increasingly higher oceanic heat content, and favorable 29° C SST temperatures. Further, models continue to relax the upper level wind shear over the next couple of days. The official NHC forecast brings ex-Gaston back to tropical storm strength in 24 hours and strengthens it further through the next couple of days. There is a wide spread in the 1200 UTC model guidance however, for ex-Gaston's intensity forecast. The GFS, HWRF, and GFDL models fail to bring the system to tropical storm strength over the next few days. Only a few of the models bring ex-Gaston back up to tropical storm strength over the next couple of days. The SHIPS, LGEM, and the SHF5 models are the most aggressive with redevelopment (**G4**). The 1200 UTC model track forecast continues to keep the remnants of ex-Gaston on a westerly path through the next several days. The system should reach St. Croix within 24 hours. Thereafter, many models have shifted slightly southward in their forecast track, primarily keeping the system to the south of Puerto Rico and the Dominican Republic. Some of the models, however, do turn the system slightly to the west-northwest over the next 48 -72 hours (**G4**).

PGI-39L/AL99:

PGI-39L is presently located at 16.2°N, 29°W, approximately 5 degrees west of the Cape Verde Islands. The environment surrounding the system is largely hostile, with dust to the north and west of the vortex, possibly entering it (**39A**). Low-level vorticity remains well established (**39B**) beneath easterly flow aloft (**C5**). Convection within the pouch is isolated to the western portion of the pouch and does not appear well organized

(39B). The GFS is unable to locate the vortex after 48 hours, with Okubo-Weiss values near zero through this time and vorticity declining as well (39C). By the weekend the GFS has the system transitioning entirely into an open wave (39D). The forecast track of the system is more westward than yesterday, however the position of the system far from operation areas for GRIP in addition to its weakening trend makes PGI-39L unlikely for an investigation target.

PGI-41L:

At 1400 UTC - was located at 12.2° N and 16.3° W, just beginning to emerge off of the African coast. As this system moves over open water, it will enter a relatively unfavorable environment. Much of the convection associated with this pouch is being sheared off to the west and southwest due to 10-20-kt east-northeasterly upper level winds. This is clearly indicated in the current visible satellite imagery (41A). The water vapor imagery suggests that there is some dry air to the north of this system which could further slow or inhibit development (41B). Current analysis however indicates a vorticity maximum directly over the system as it traverses the eastern Atlantic (41C).

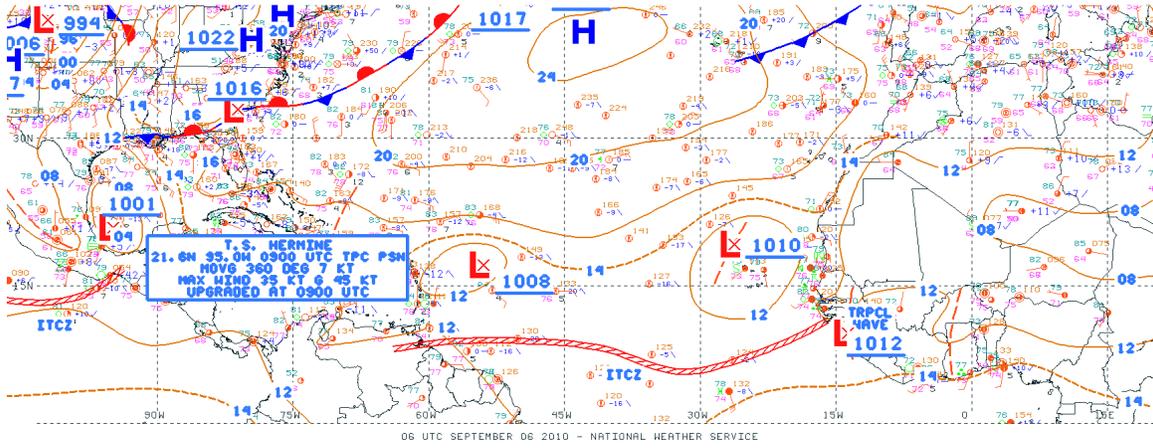
As PGI-41L pushes westward, it will be surrounded by a marginally favorable environment for development. The GFS is quite aggressive on developing this system into a tropical cyclone within 72 hours (41D), the ECMWF is shows less impressive prospects over the same time period (41E). Models keep the system under the influence of wind shear over the next couple of days. This system will be over warm 28-29°C SSTs as it moves generally westward (H4).

Dust/SAL Discussion:

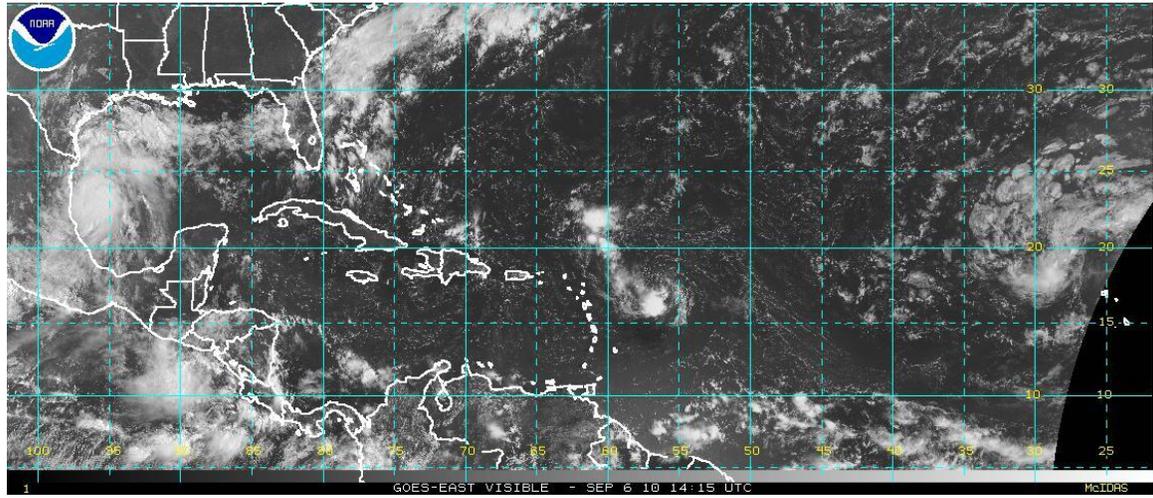
Dry air analysis shows the SAL interacting with PGI-39L and to some extent with the remnants of Gaston (D1, D2). Mid level water vapor shows a corresponding region of dry air for this region, with a large area out ahead of PGI-39L extending westward towards ex-Gaston (D3). An AIRS sounding from northeast of ex-Gaston reveals the dry air exists extending from 850 hPa and above (D4). The GEOS-5 depicts the dust plume initially stretching from the Moroccan coastline towards PGI-39L and southwestward towards ex-Gaston (D5) and weakening over the next few days. The next SAL outbreak is forecasted to exit the African coastline at 0000 UTC Wednesday (D6).

Images used in discussion:

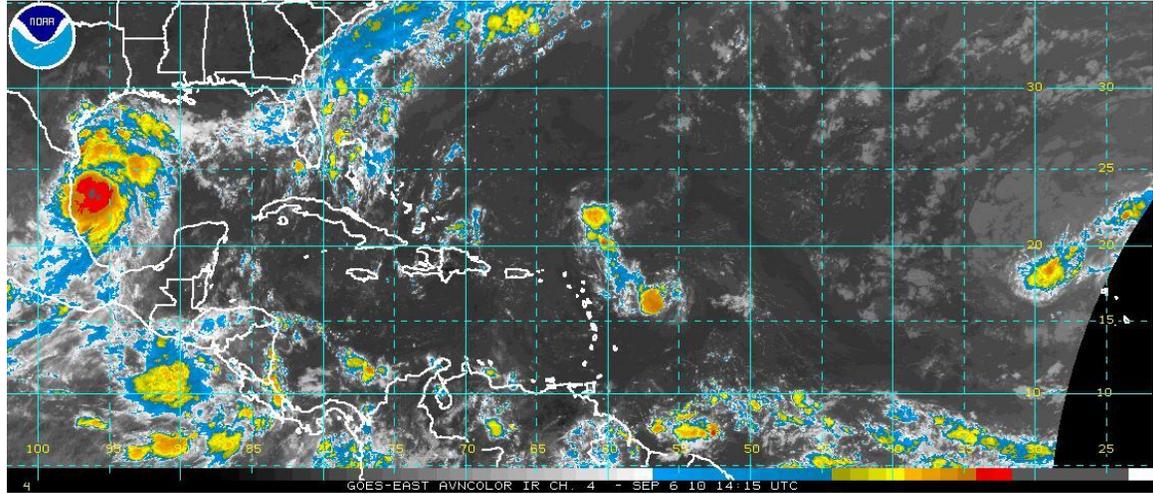
S1



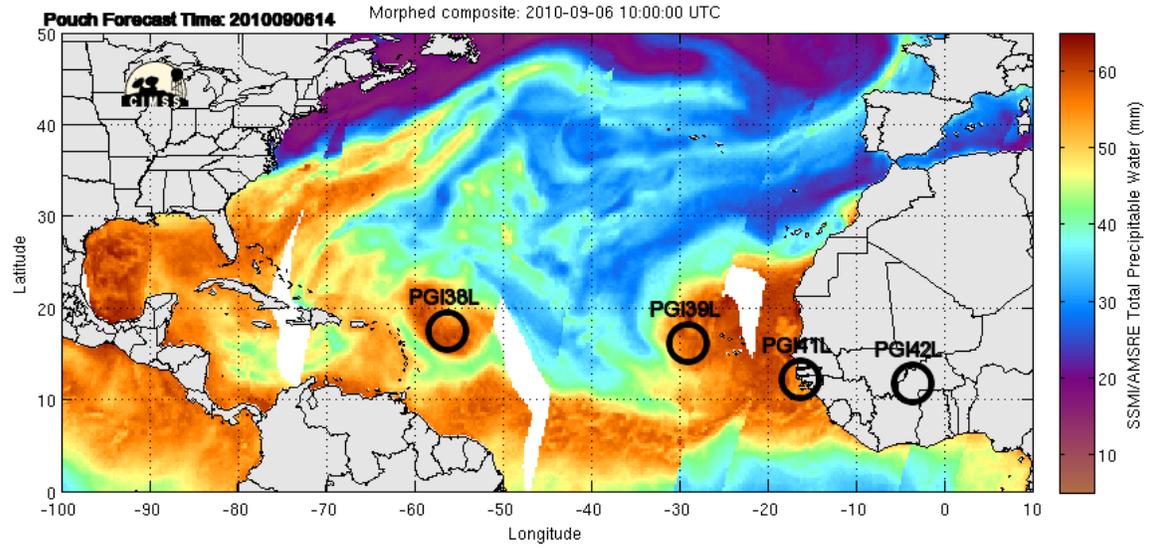
S2



S3

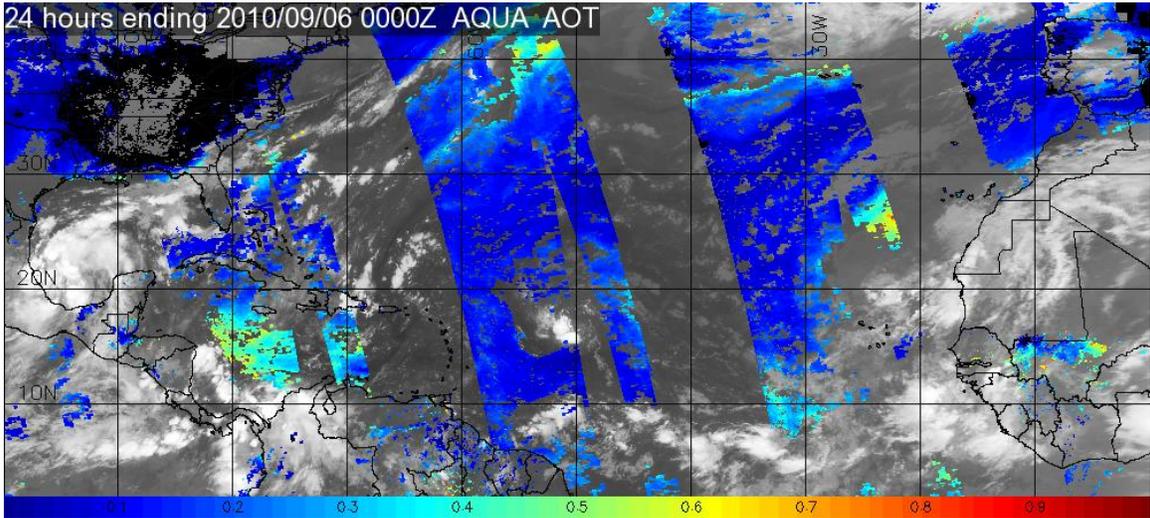


S4



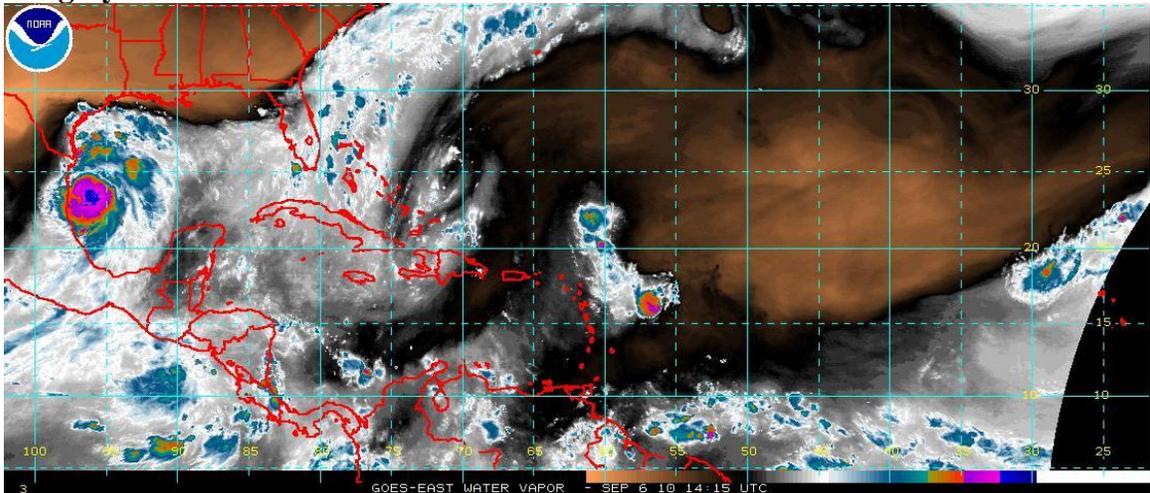
S5 AOT from JPL:

24 hours ending 2010/09/06 0000Z AQUA AOT

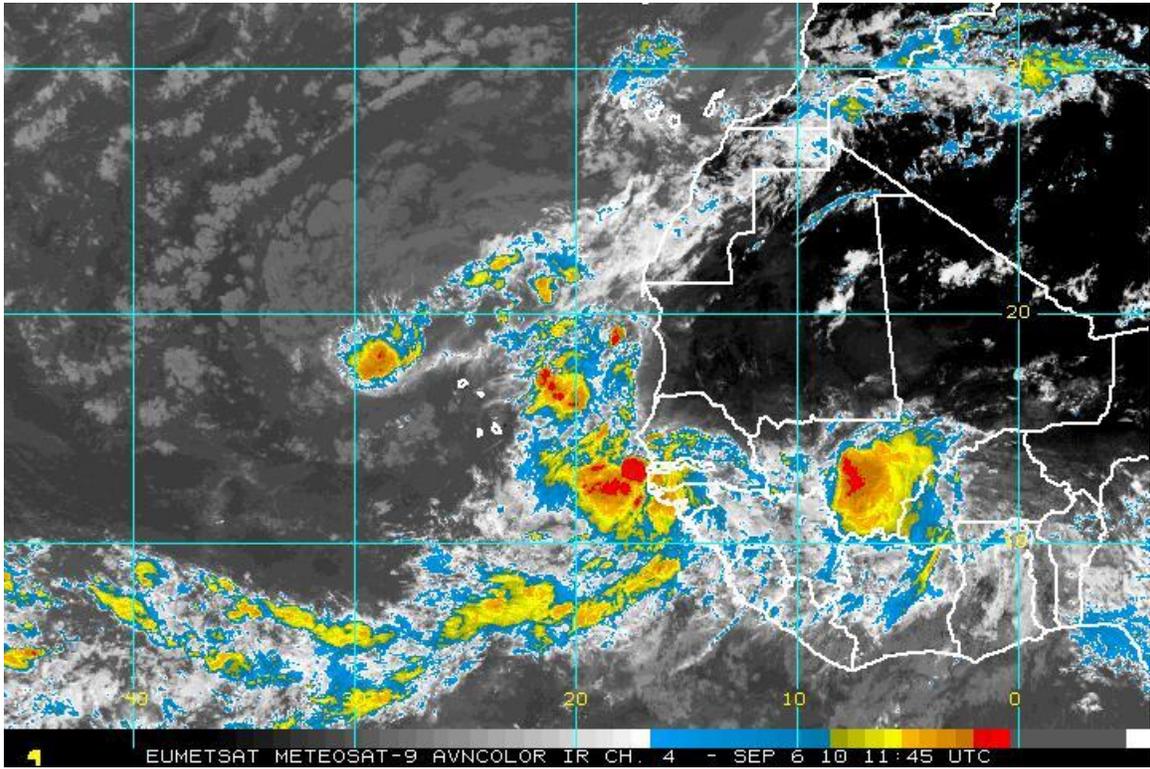


S6 Water Vapor

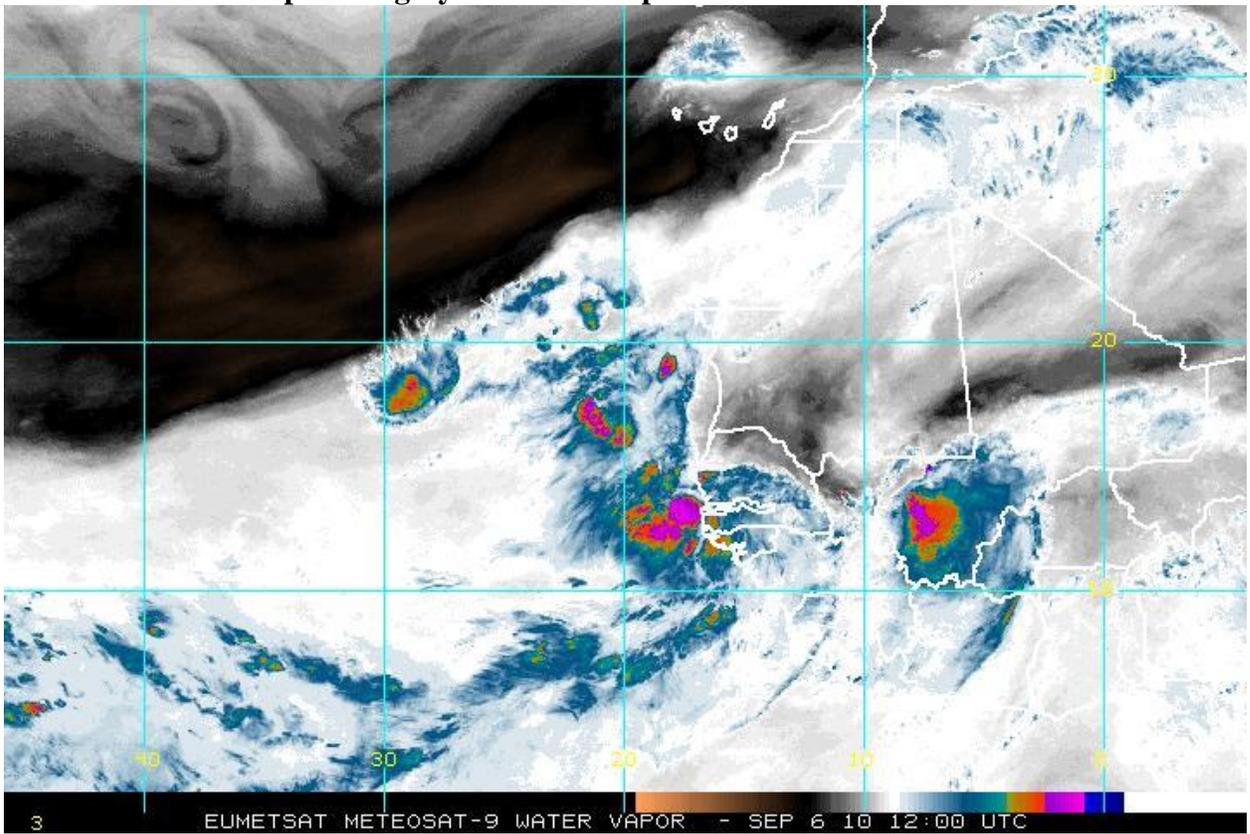
Imagery



S7

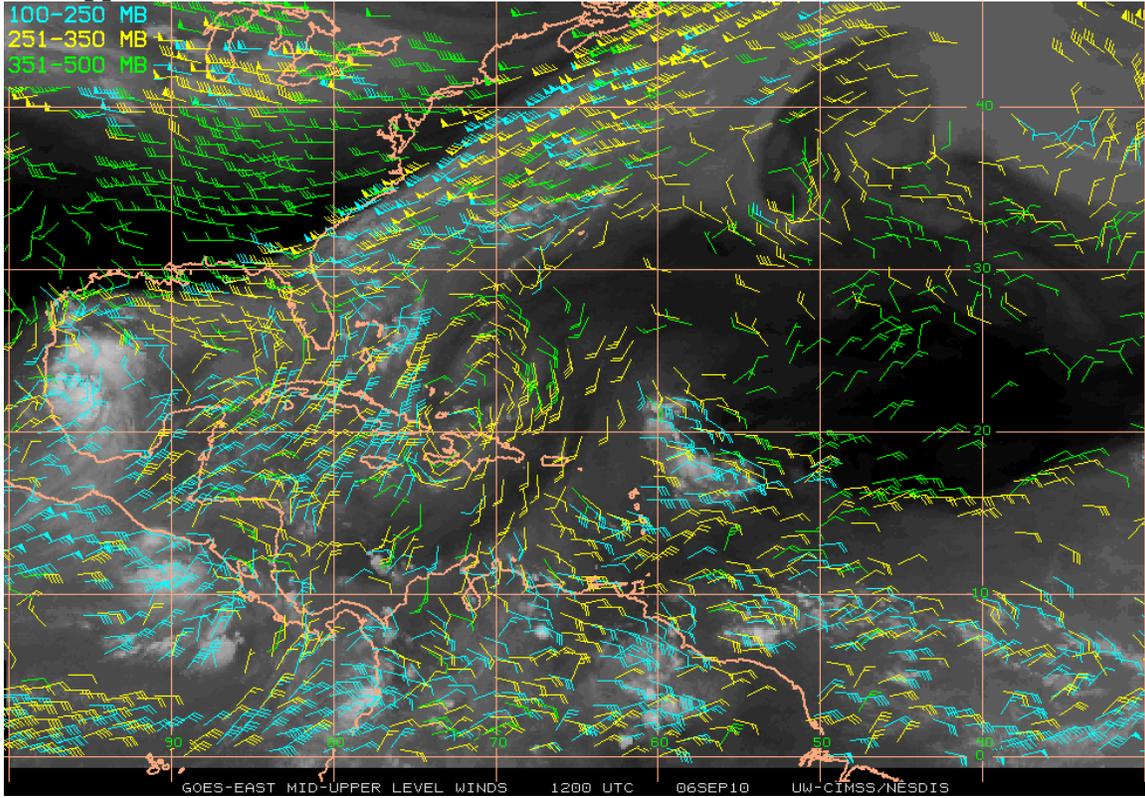


S8- Africa Water Vapor Imagery 1200 UTC Sept 6

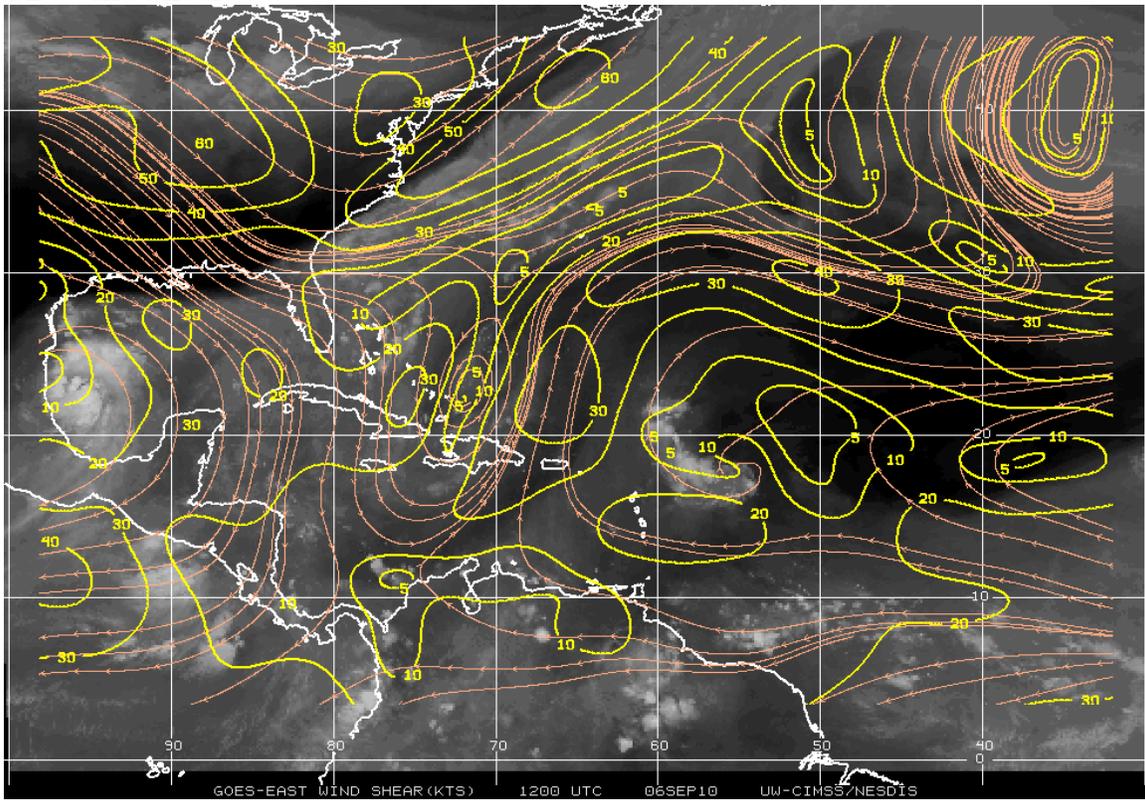


CIMSS Analyses:

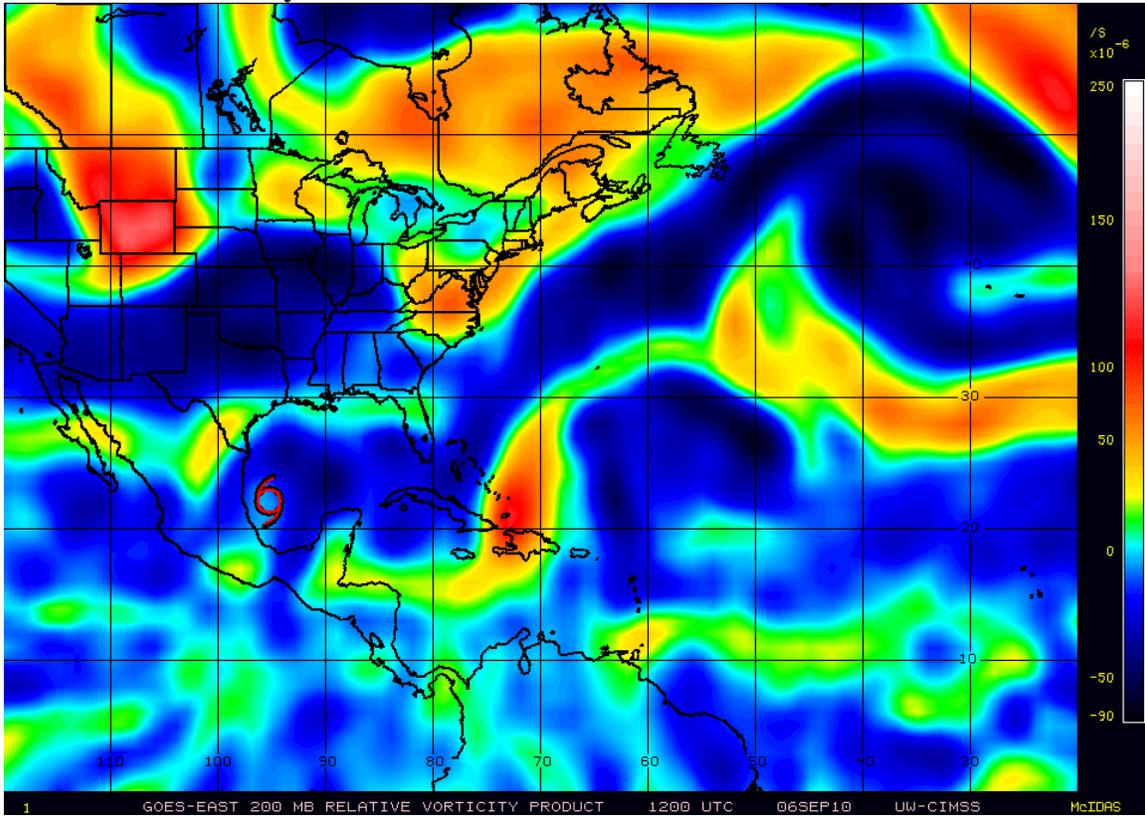
C1- Upper Level Winds



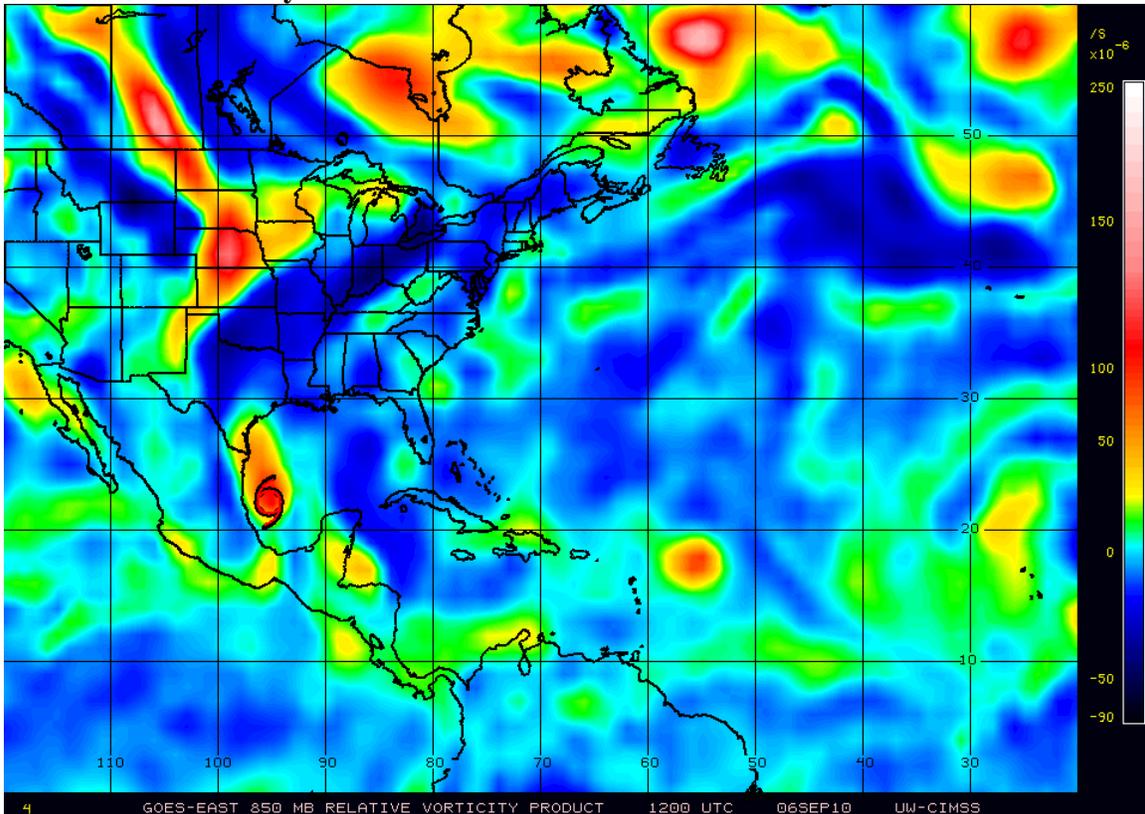
C2- Wind Shear



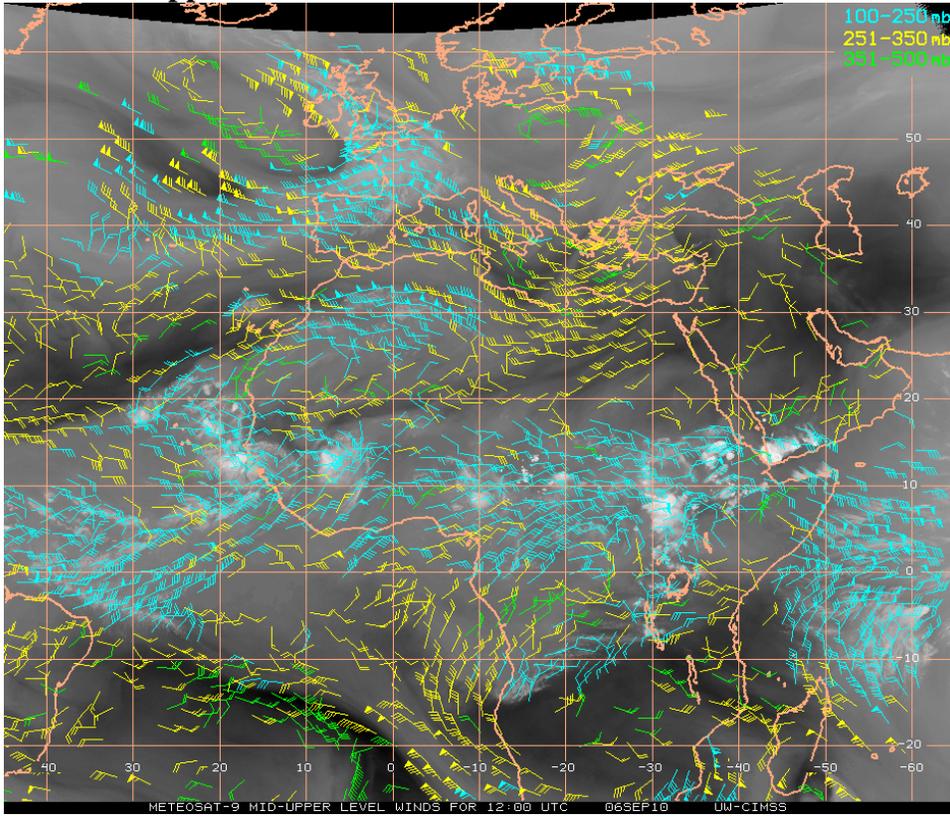
C3- 200 hPa Vorticity



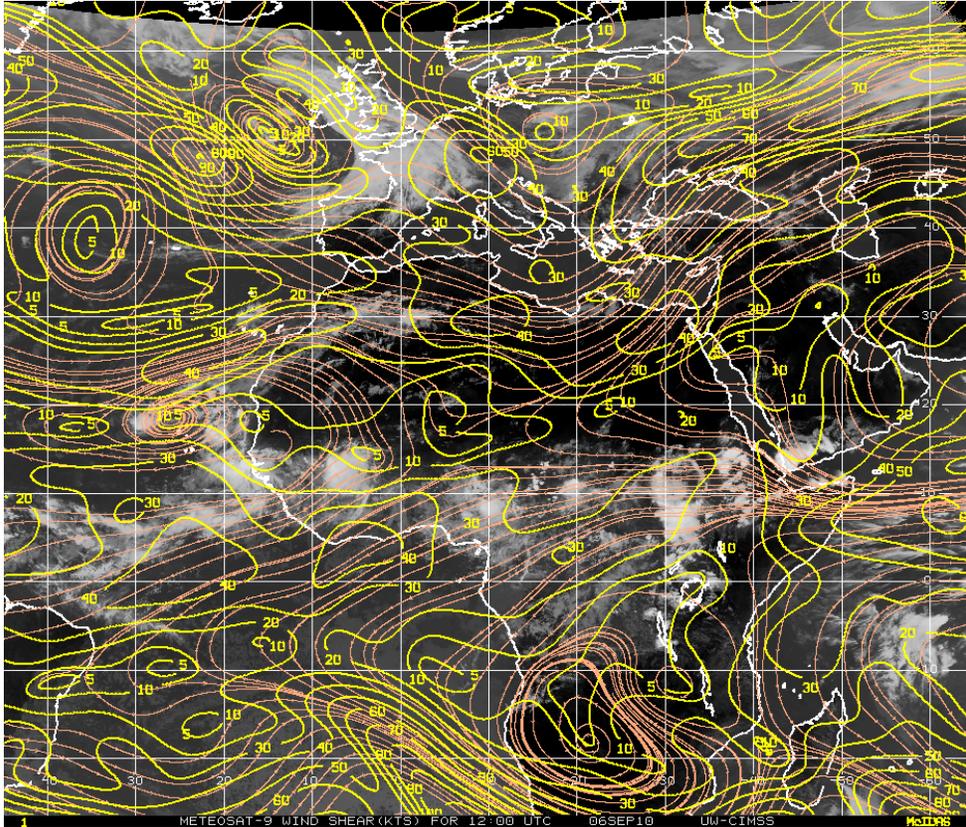
C4- 850 hPa Vorticity



C5 Africa Upper Level Winds:

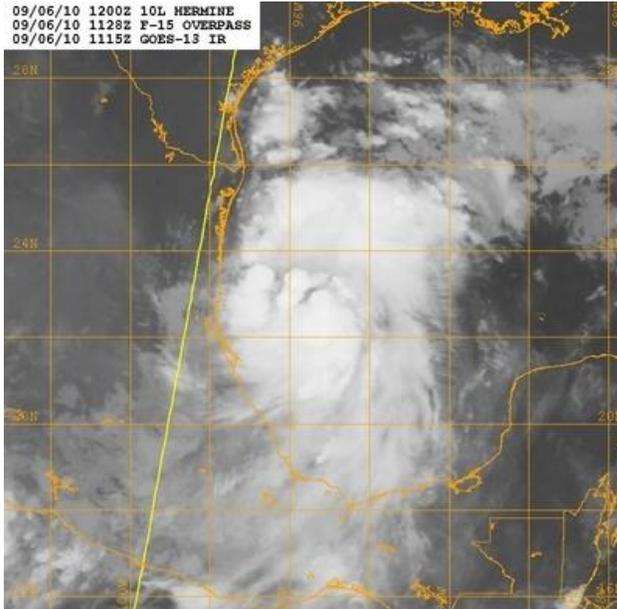


C6 Wind Shear over West Africa:

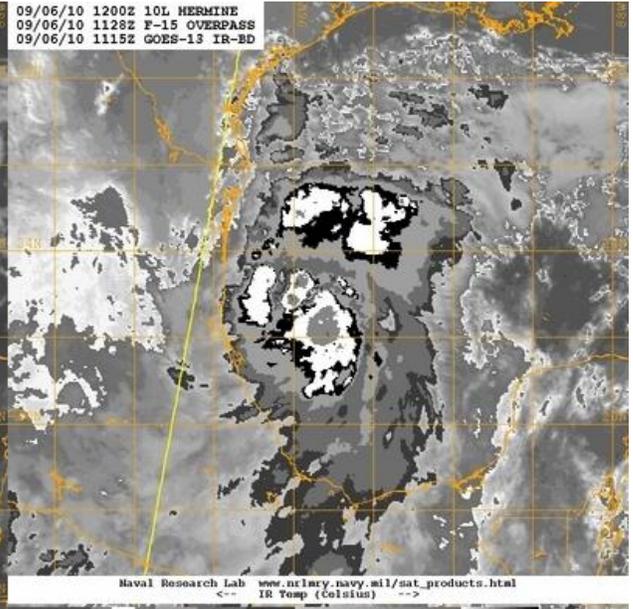


TS Hermine: H1

09/06/10 1200Z 10L HERMINE
09/06/10 1128Z F-15 OVERPASS
09/06/10 1115Z GOES-13 IR

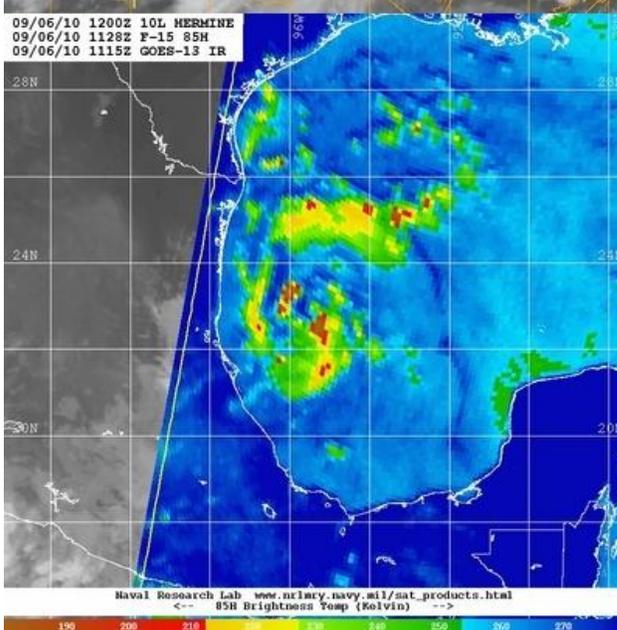


09/06/10 1200Z 10L HERMINE
09/06/10 1128Z F-15 OVERPASS
09/06/10 1115Z GOES-13 IR-BD



Naval Research Lab www.nrlmry.navy.mil/sat_products.html
← IR Temp (Kelvin) →

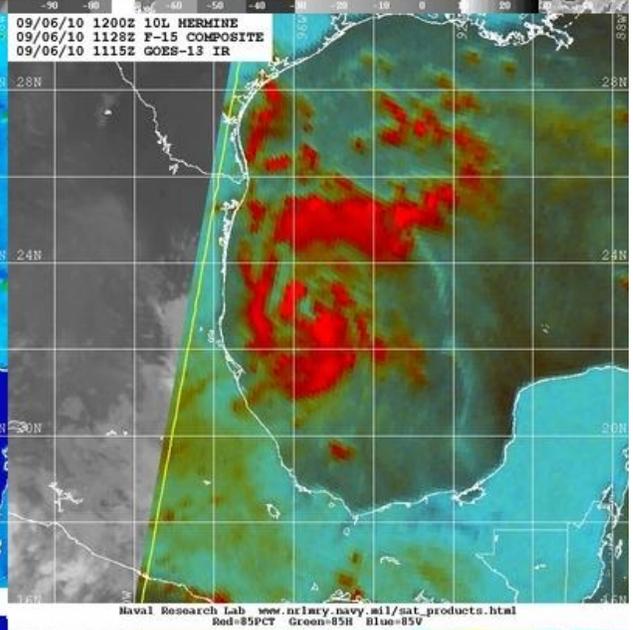
09/06/10 1200Z 10L HERMINE
09/06/10 1128Z F-15 85H
09/06/10 1115Z GOES-13 IR



Naval Research Lab www.nrlmry.navy.mil/sat_products.html
← 85H Brightness Temp (Kelvin) →



09/06/10 1200Z 10L HERMINE
09/06/10 1128Z F-15 COMPOSITE
09/06/10 1115Z GOES-13 IR

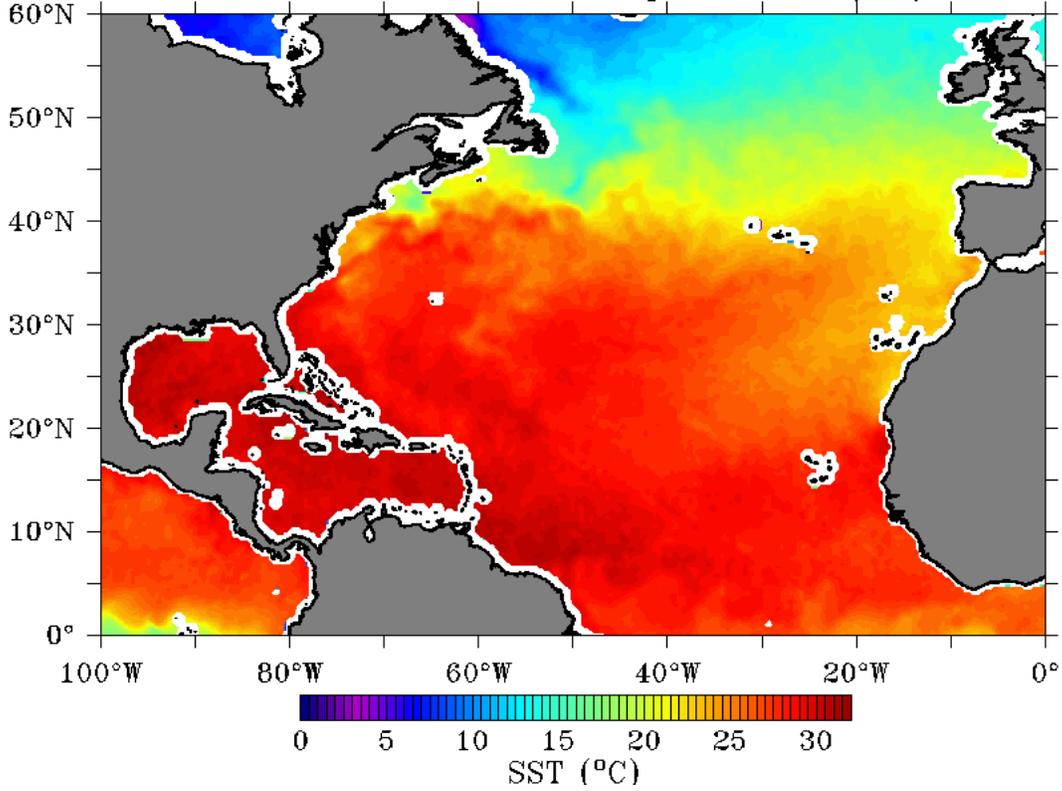


Naval Research Lab www.nrlmry.navy.mil/sat_products.html
Red-85H Green-85H Blue-85H

September 6, 2010 6Z CIMMS shear analysis

H4

SSMI-TMI Sea Surface Temperature: 09/05/2010



H5

TROPICAL STORM HERMINE (AL10)

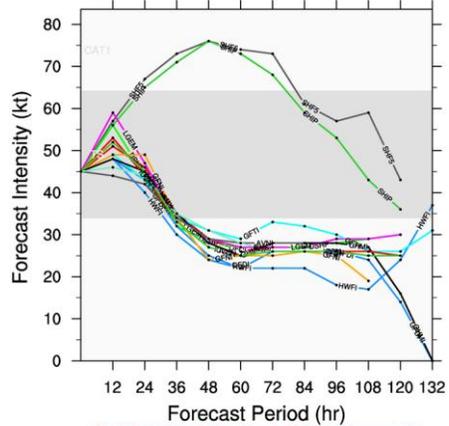
Early-cycle track guidance valid 1200 UTC, 06 September 2010



This plot does not display official storm information. Use for information purposes only. DO NOT USE FOR LIFE AND DEATH DECISIONS!

TROPICAL STORM HERMINE (AL10)

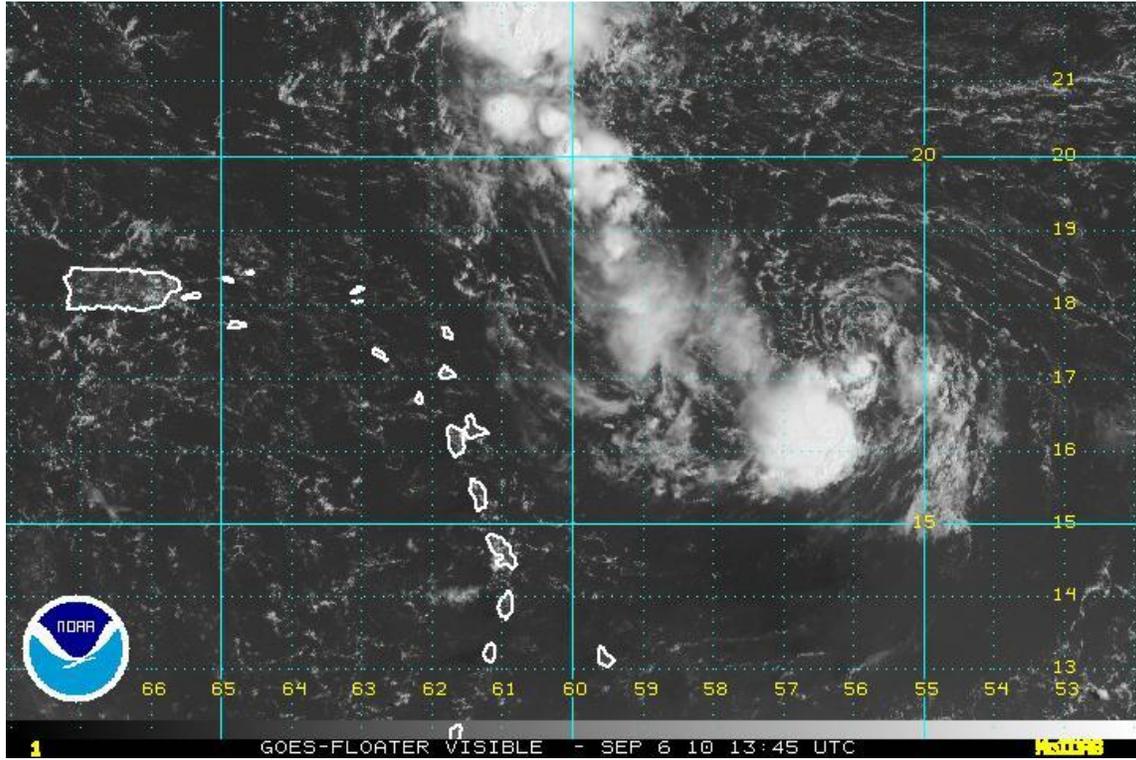
Early-cycle intensity guidance valid 1200 UTC, 06 September 2010



This plot does not display official storm information. Use for information purposes only. DO NOT USE FOR LIFE AND DEATH DECISIONS!

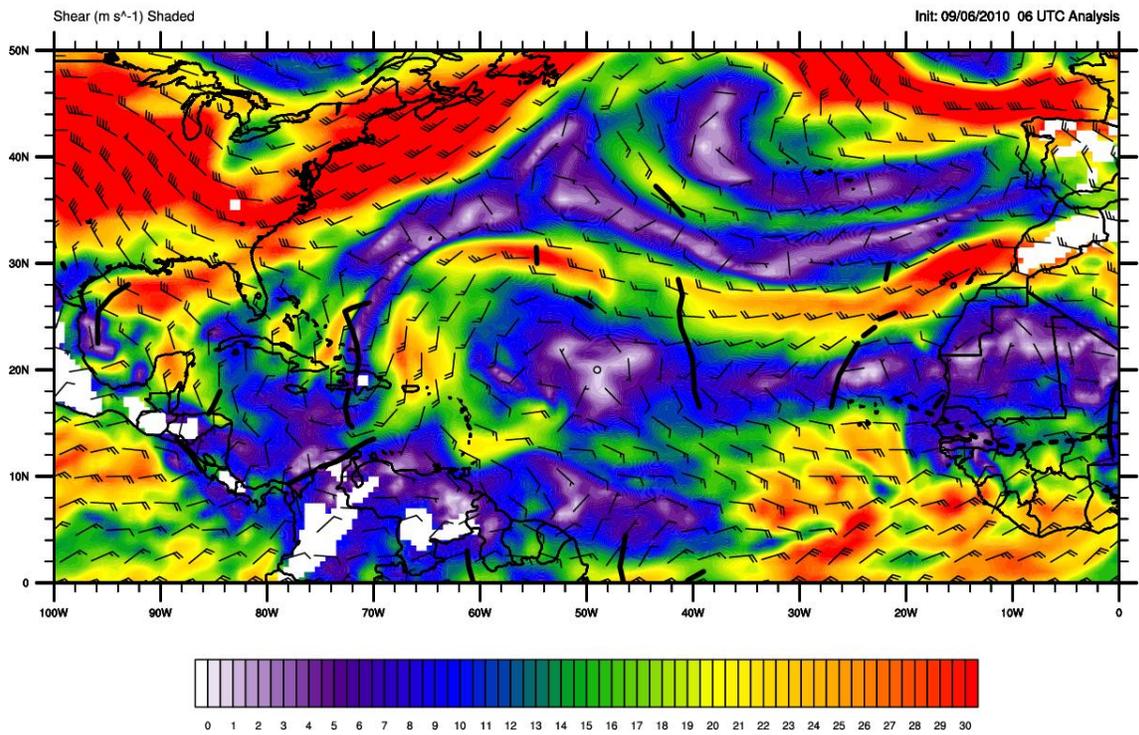
Ex-Gaston/PGI-38L:

G1

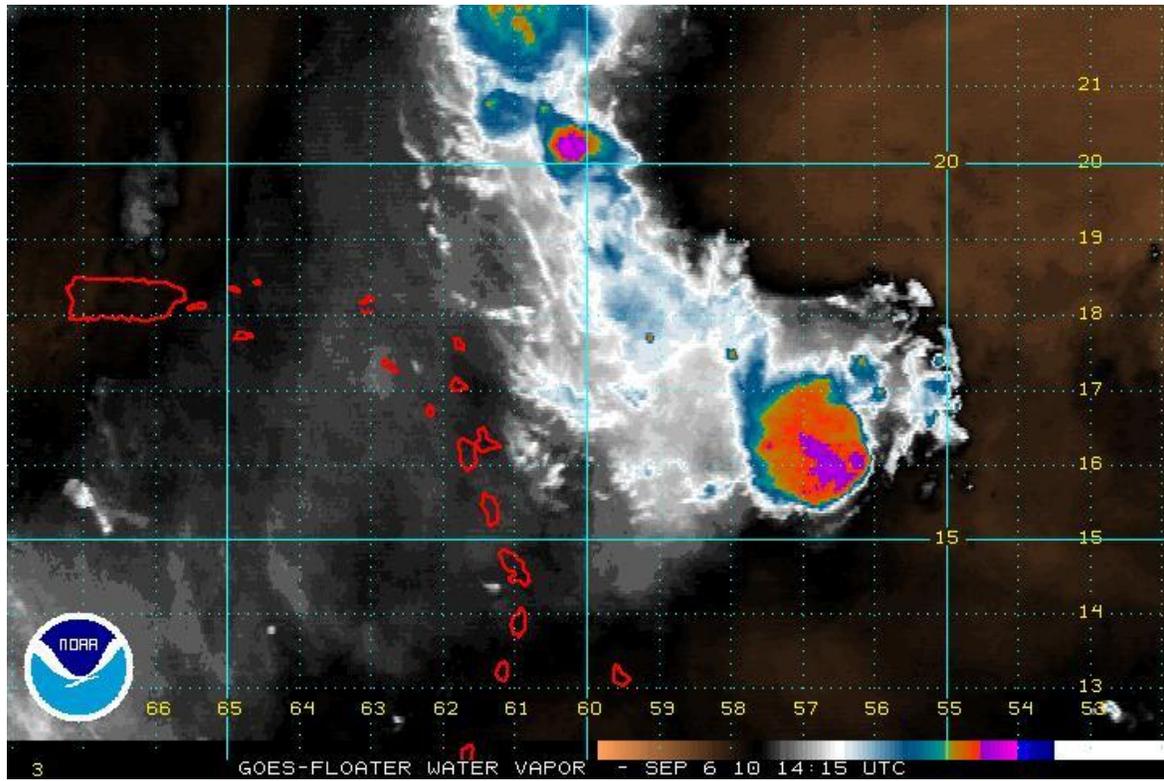


G2

200-900 hPa Wind Shear, Shear Vectors

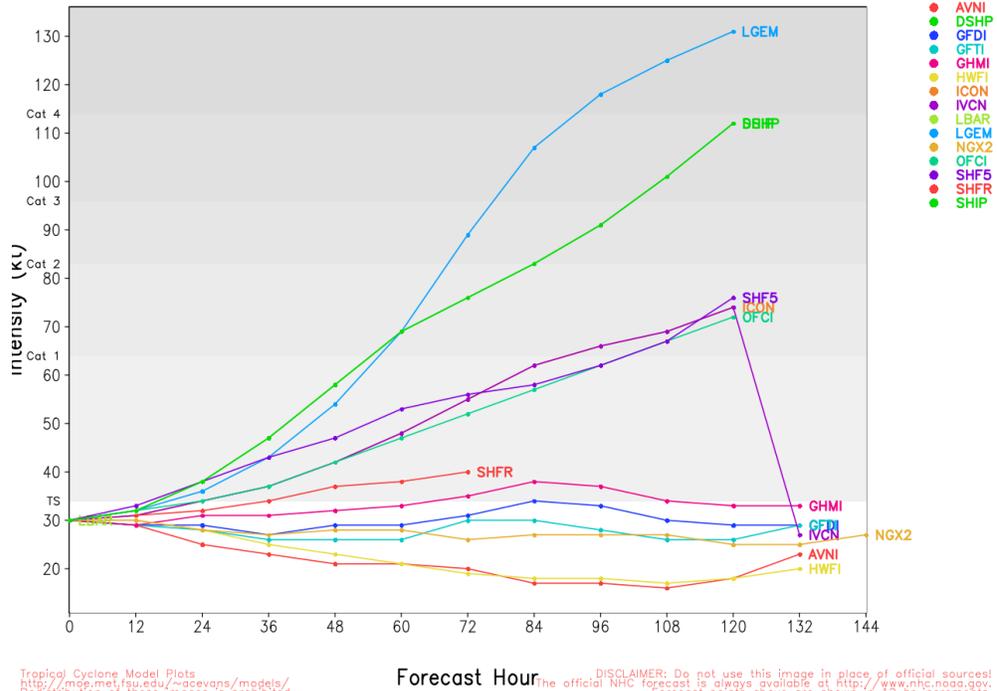


G3



G4

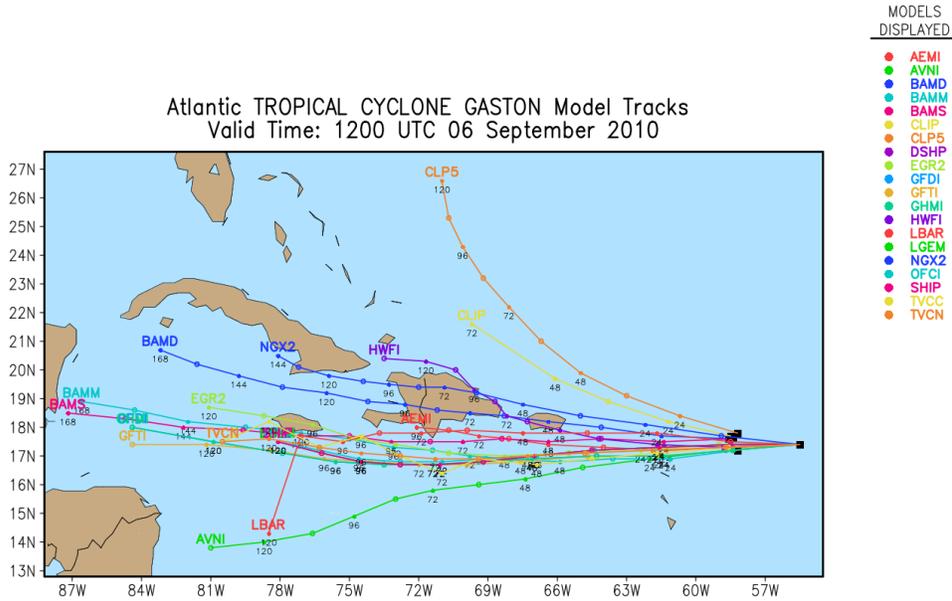
Atlantic TROPICAL CYCLONE GASTON Model Intensities
Valid Time: 1200 UTC 06 September 2010



Tropical Cyclone Model Plots
<http://mop.met.fsu.edu/~ocevans/models/>
Redistribution of these images is prohibited.

DISCLAIMER: Do not use this image in place of official sources!
The official NHC forecast is always available at <http://www.nhc.noaa.gov>.
Forecast points above are shown in 12 hr increments.

G4 cont'd

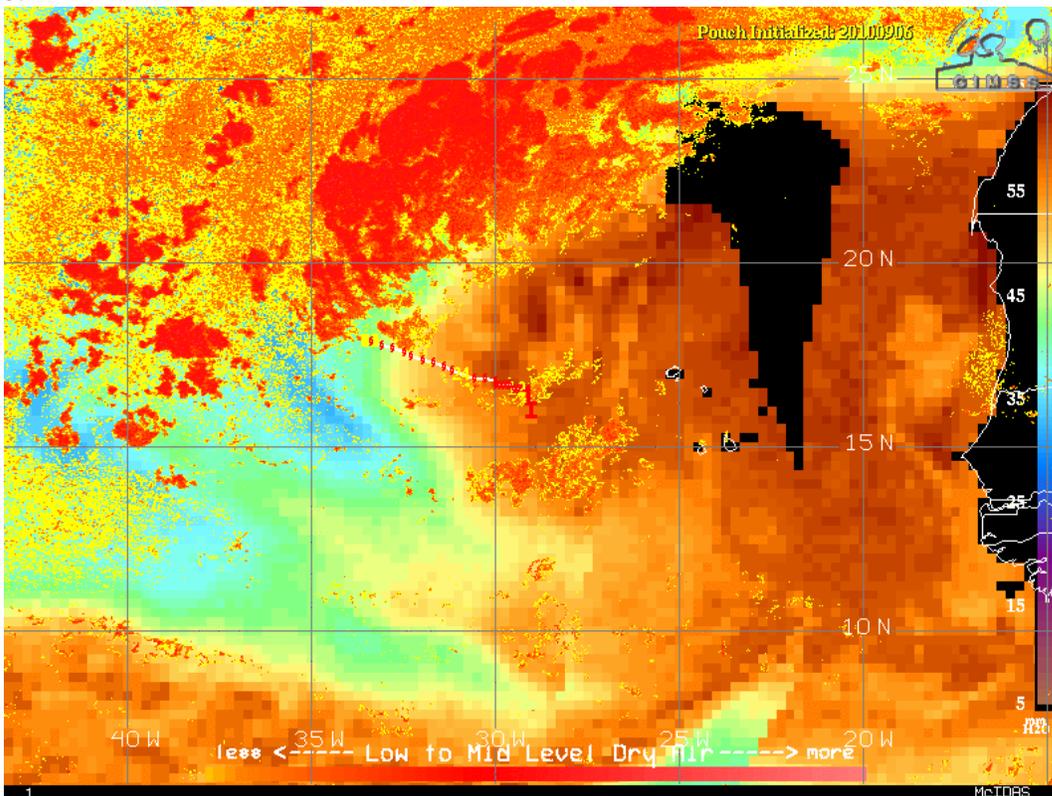


Tropical Cyclone Model Plots
<http://mop.met.fsu.edu/~acevans/models/>
 Redistribution of these images is prohibited.

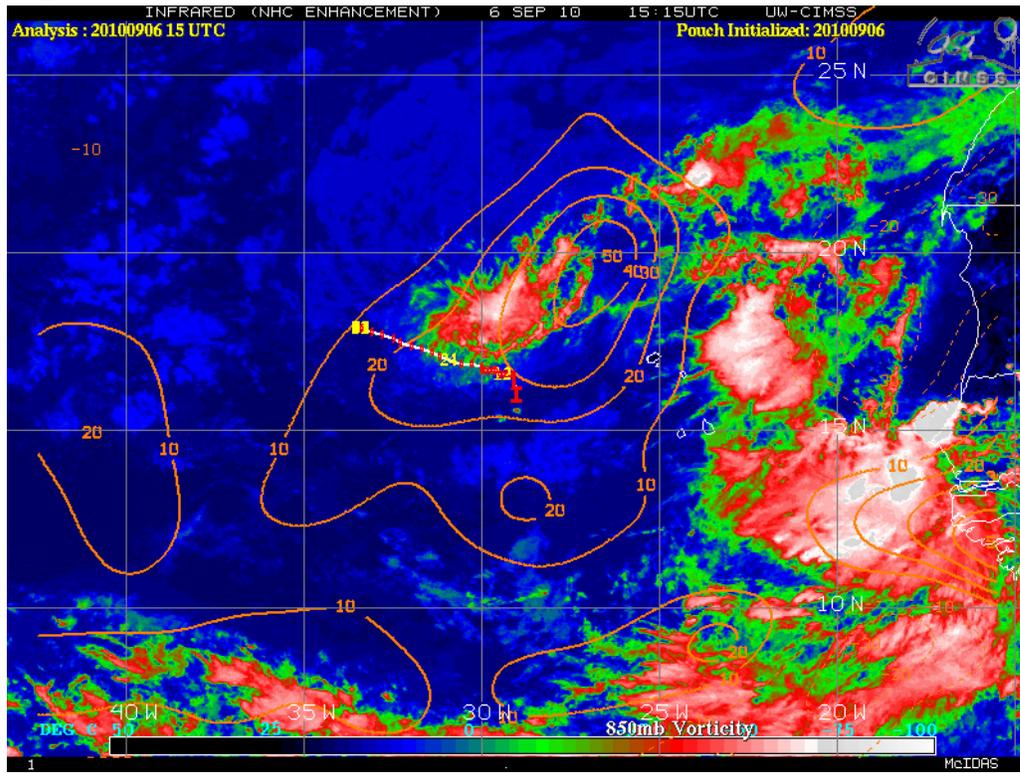
DISCLAIMER: Do not use this image in place of official sources.
 The official NHC forecast is always available at <http://www.nhc.noaa.gov>.
 Forecast points above are shown in 12 hr increments. Initial points denoted by black squares.

PGI Systems:

39A



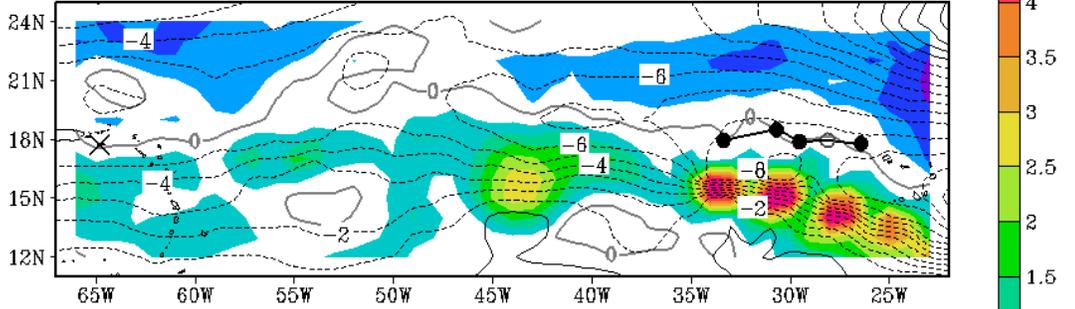
39B



39C

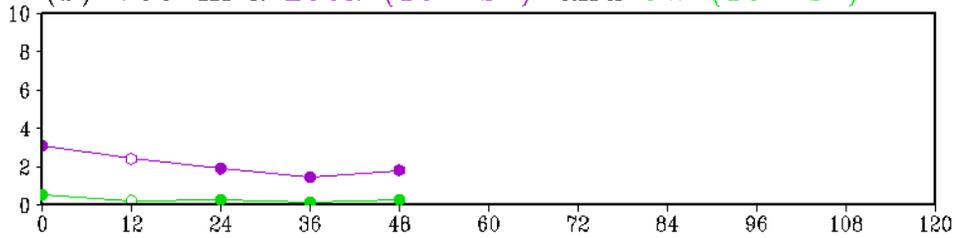
PGI39L: 5-Day Forecast Based on GFS
 Initialized at 2010090600

(a) Track, 700 hPa U and Zeta (5-day average)

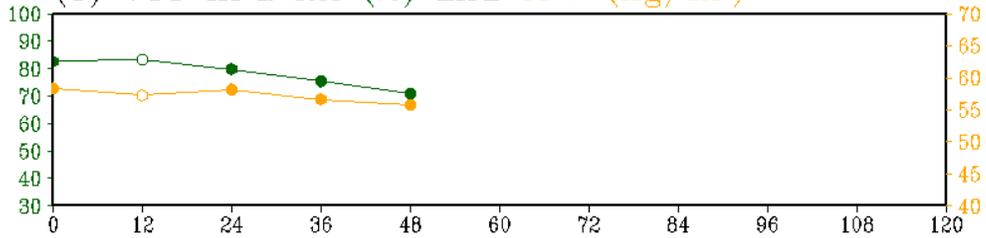


3x3 degree box averages following the pouch:

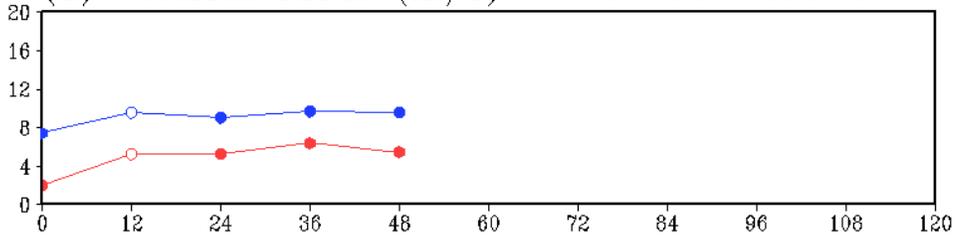
(b) 700 hPa Zeta (10^{-5} s^{-1}) and OW (10^{-9} s^{-2})



(c) 700 hPa RH (%) and TPW (kg/m^3)



(d) Vertical shear (m/s)
 Deep 200-850 hPa
 Pouch 500-850 hPa



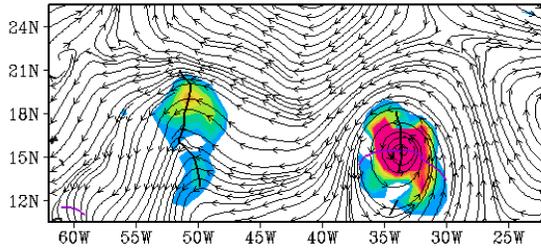
39D

PGI39L: 2010090600 (120h GFS valid at 00Z11SEP2010)

Level Tracked: 700 hPa

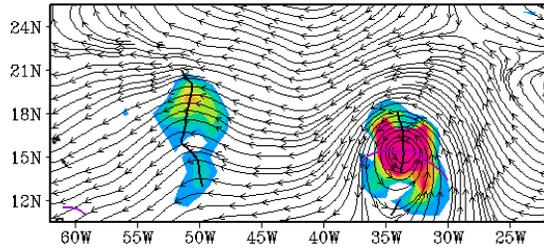
Comoving ($C_p = -2.4$ m/s)

700 hPa Streamlines and Zeta (10^{-6} s $^{-1}$)

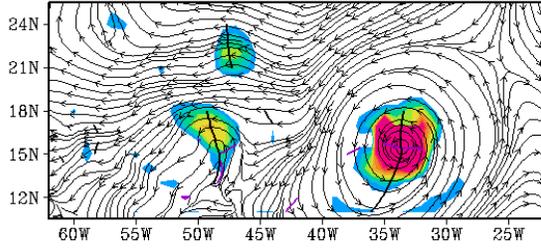


Earth-relative ($C_p = 0$ m/s)

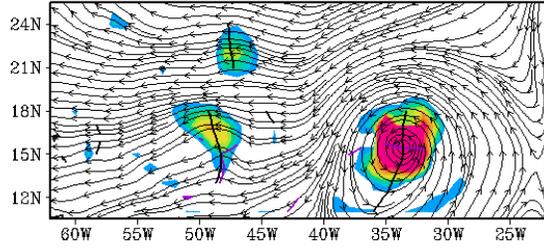
700 hPa Streamlines and Zeta (10^{-6} s $^{-1}$)



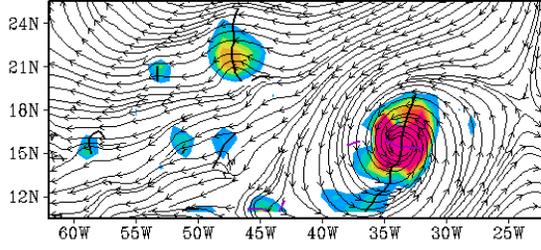
850 hPa Streamlines and Zeta (10^{-6} s $^{-1}$)



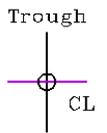
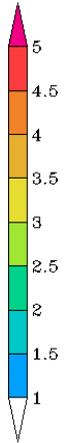
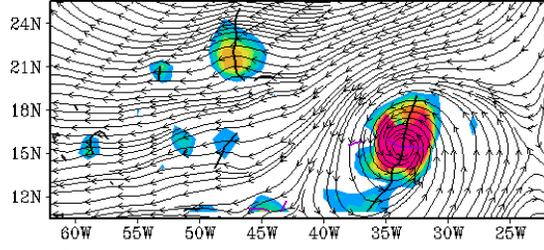
850 hPa Streamlines and Zeta (10^{-6} s $^{-1}$)



925 hPa Streamlines and Zeta (10^{-6} s $^{-1}$)

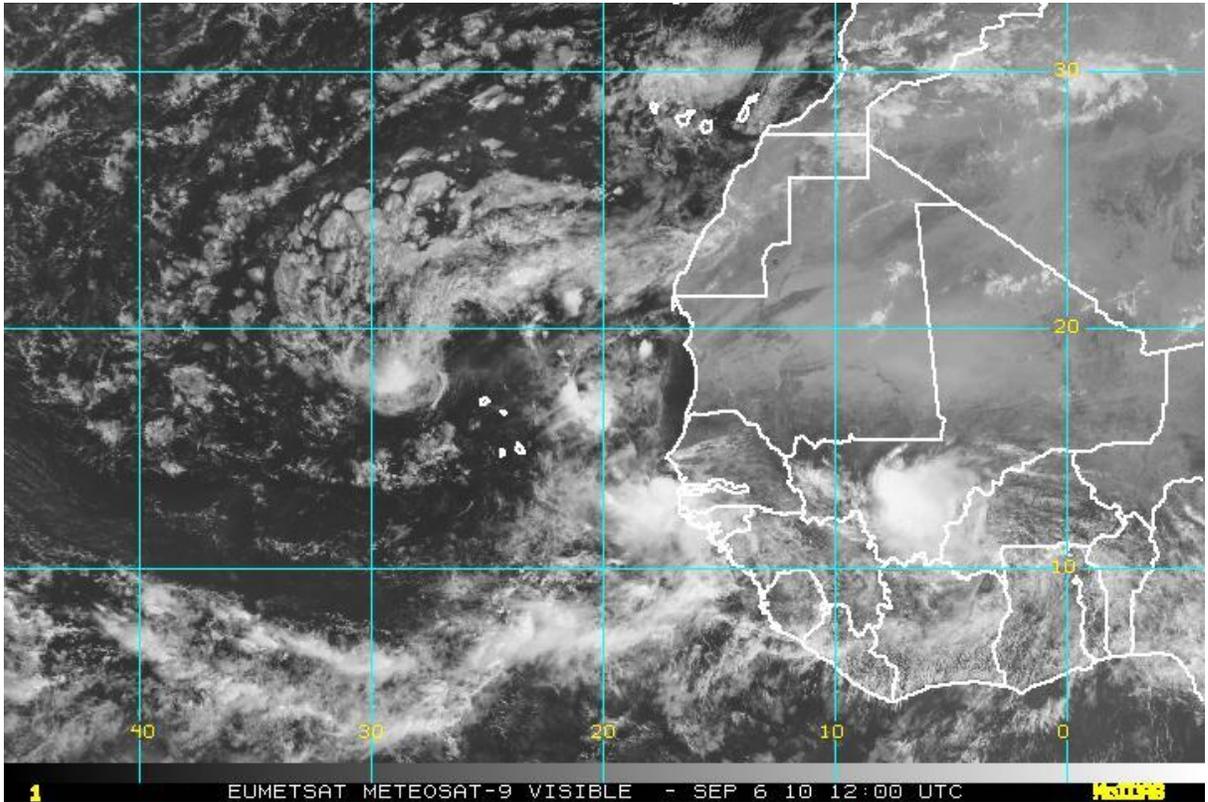


925 hPa Streamlines and Zeta (10^{-6} s $^{-1}$)

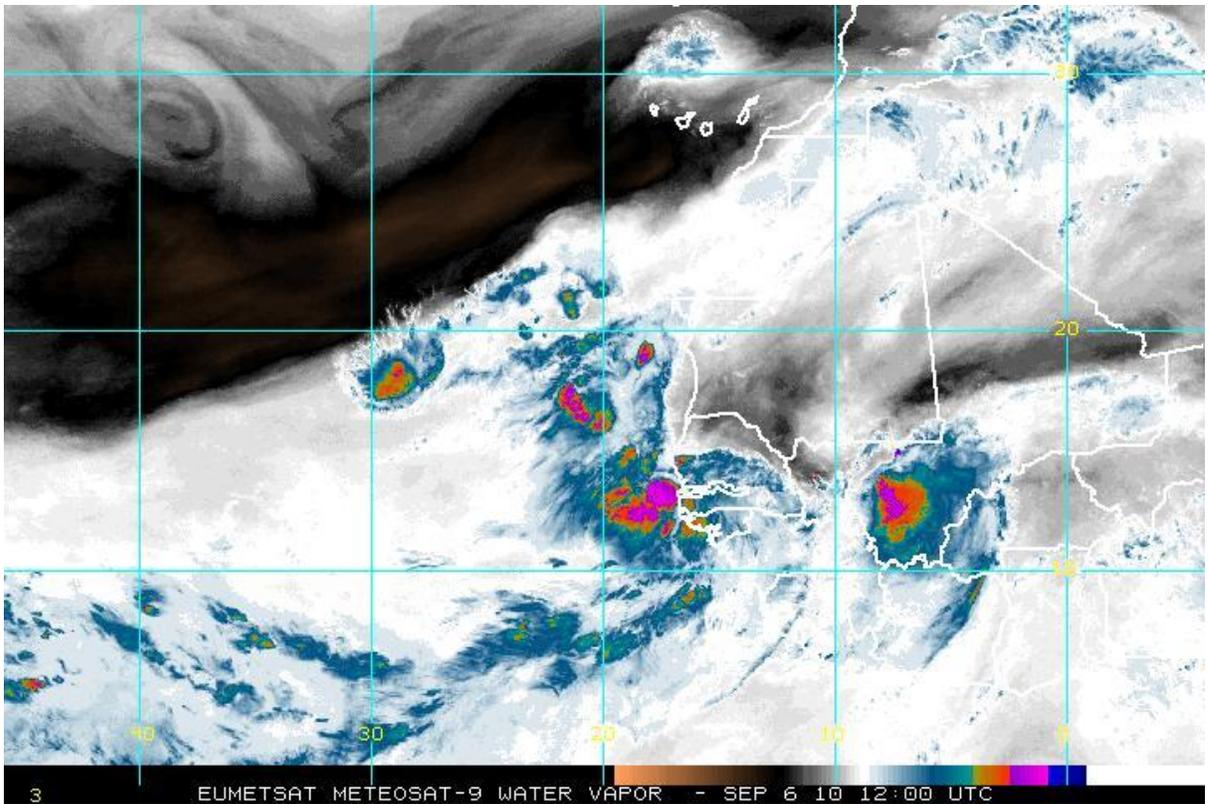


GFS 120 hr forecast at 0 UTC September 11th (PGI-39L is the western trough)

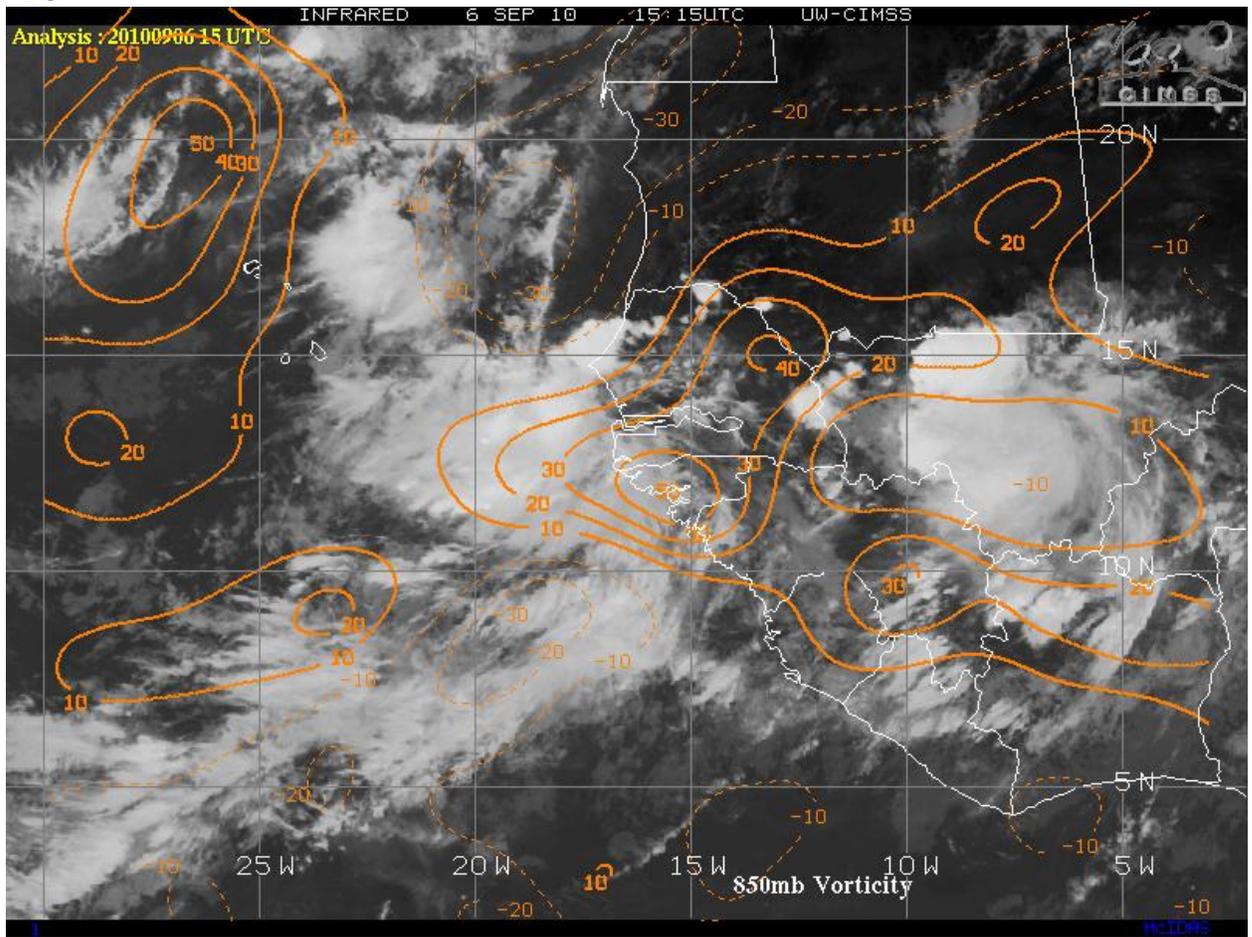
41A



41B

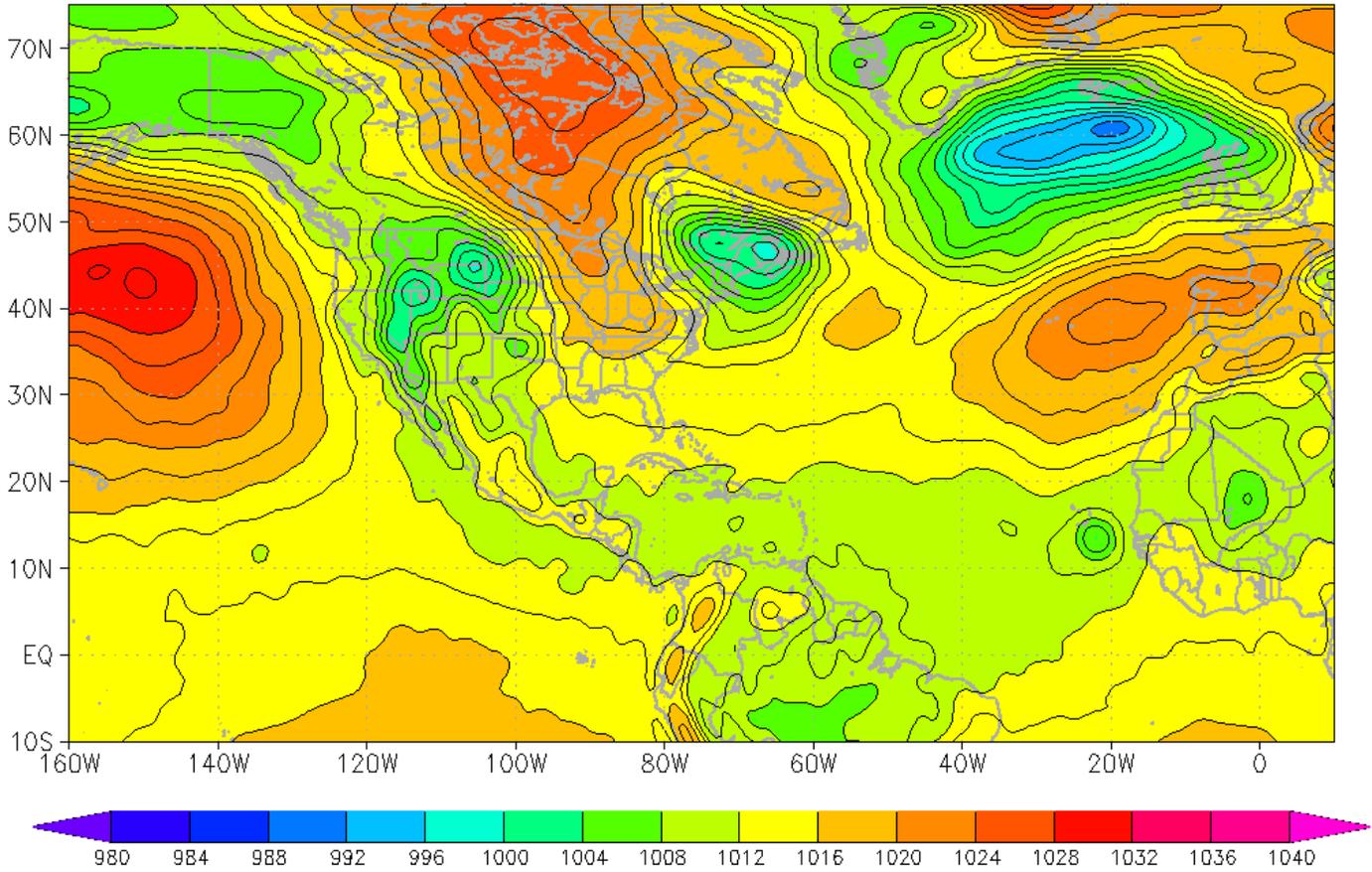


41C



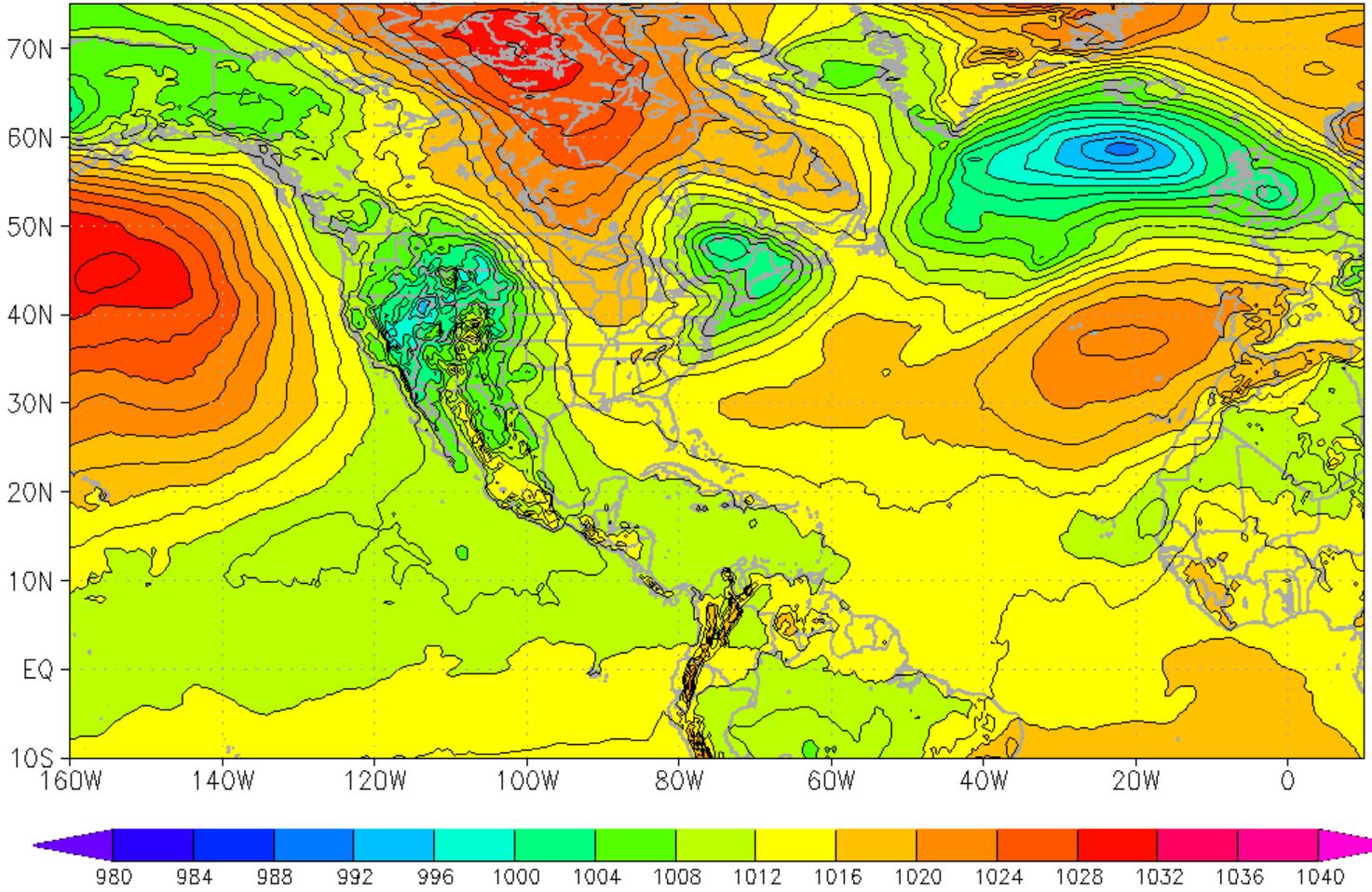
41D

06Z06SEP2010 gfs MSLP (mb) T=72 h

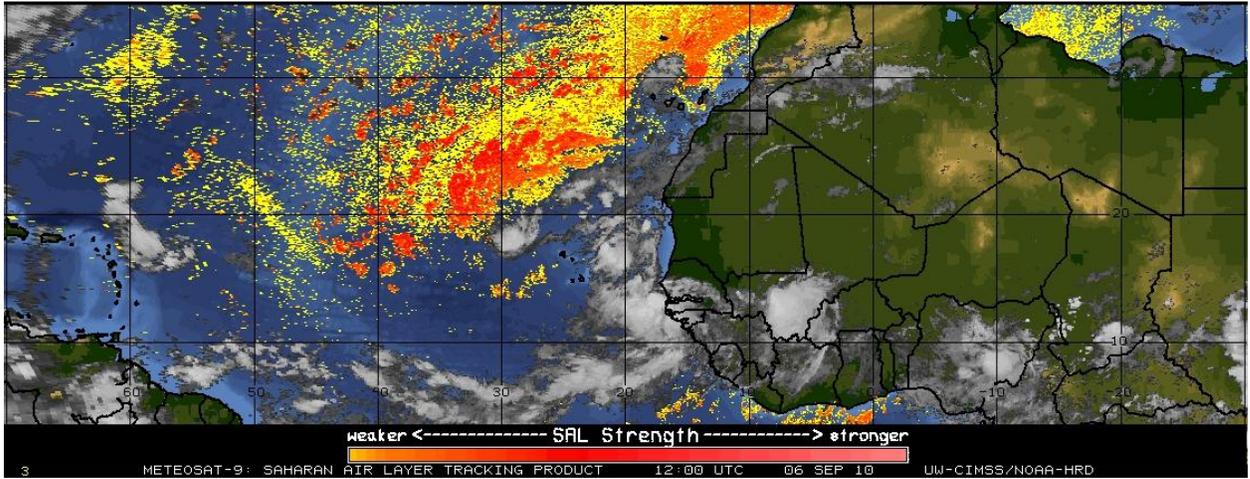


41E

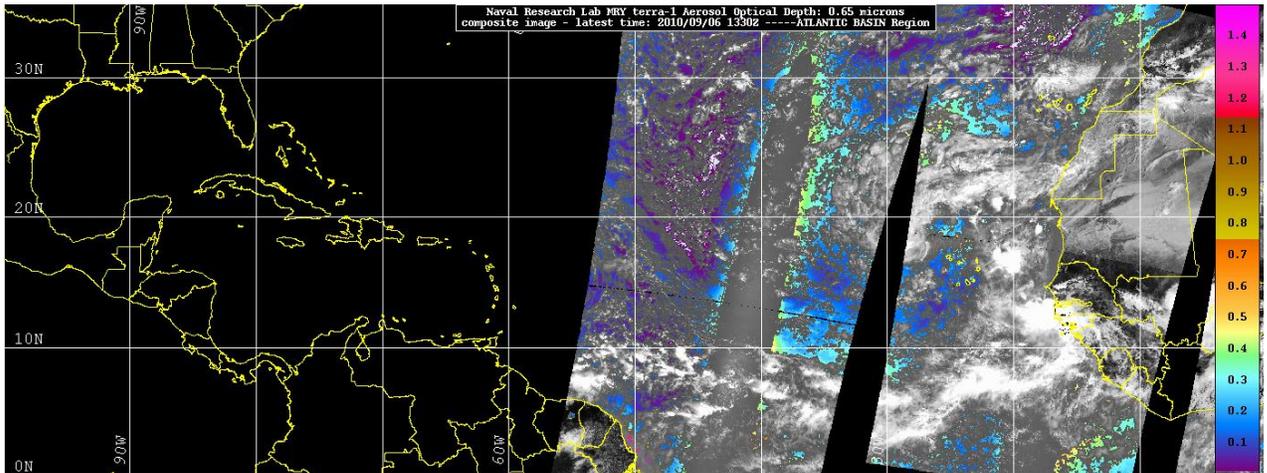
00Z06SEP2010 ecmwf-oper MSLP (mb) T=72 h



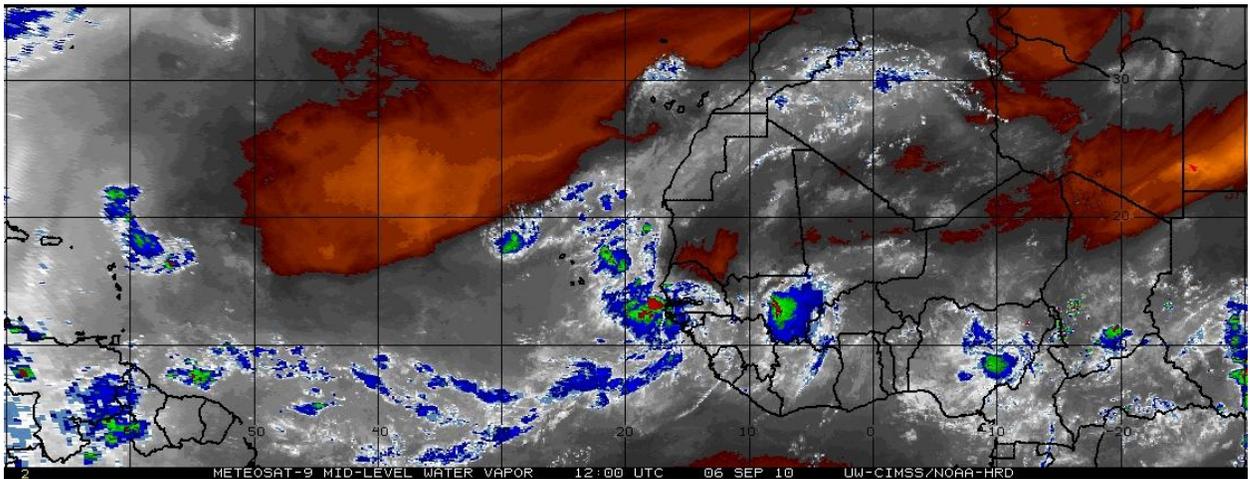
Dust:
D1



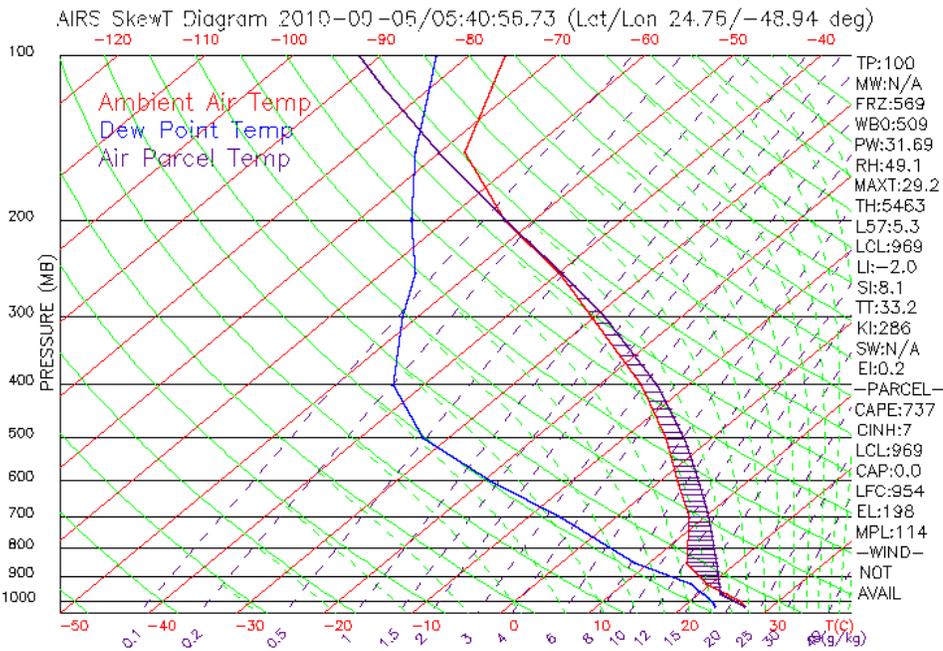
D2



D3

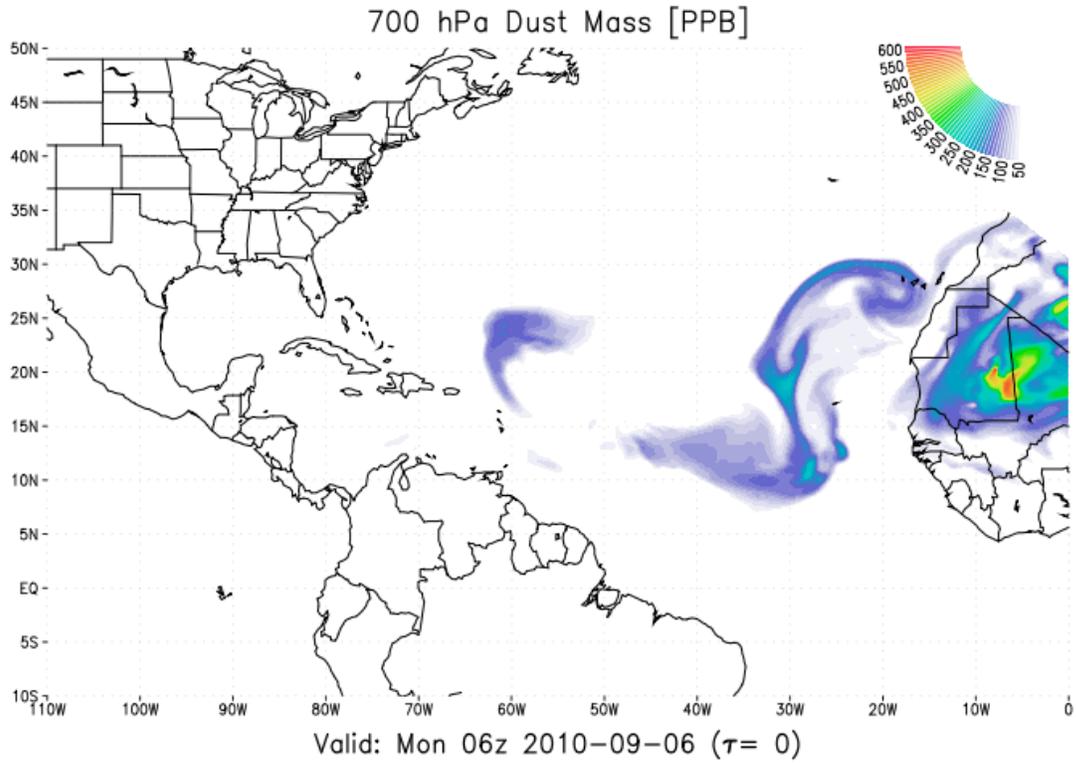


D4



D5

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D6

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